Fermilab

S. Velen
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# R. P. NOTE #28

Recently, dose rates at two 12" diameter cable penetrations were measured when a beam of about 5E11 proton/pulse was being dumped on a 5.75" x 5.75" x 5' long iron collimator jaw in the P-West Beam Line. These measured values are then compared to calculations using the method of Gollon and Awschalom[1] for Labyrinths. The calculation assumed an on axis, $90^{o}$ point source loss.

The cable penetration on the P-Center side was then plugged with 3' to 4' of sand bags. This cable penetration on the west side is half filled with cables. Therefore, only the upper half of this penetration could be plugged with sand bags. 2' to 2.5' of sand bags were added to each end of the penetration. See Fig. 1 for details. The results are summarized in Table I.

Three conclusions can be drawn from the data:

1. The measurements agree reasonably well with the calculations.
2. In this geometry, plugging the penetration closest to the source has no effect.
3. Every foot of sand added to the penetration at the end farthest from the source reduces the dose rate by a factor of four.

[1] Design of Penetrations in Hadron Shields, Gollon & Awschalom, International Congress on Protection Against Accelerator & Space Radiation, CERN Report 71-16, Vol. 2, July 1971.

TABLE I

| | Measured Dose Rate No Sand | Calculated Dose Rate No Sand | Measured Dose Rate With Sand |
|---|---|---|---|
| P-Center Penetration | 25±6 | 39 | 0.250±.03 |
| Penetration to West manhole | 2.3±0.9 | 3.2 * | 0.130±0.04 ** |

Note: All readings are in Rem/hr normalized to 2.5E13ppp, 300 pulses/hr, Q.F. = 5.

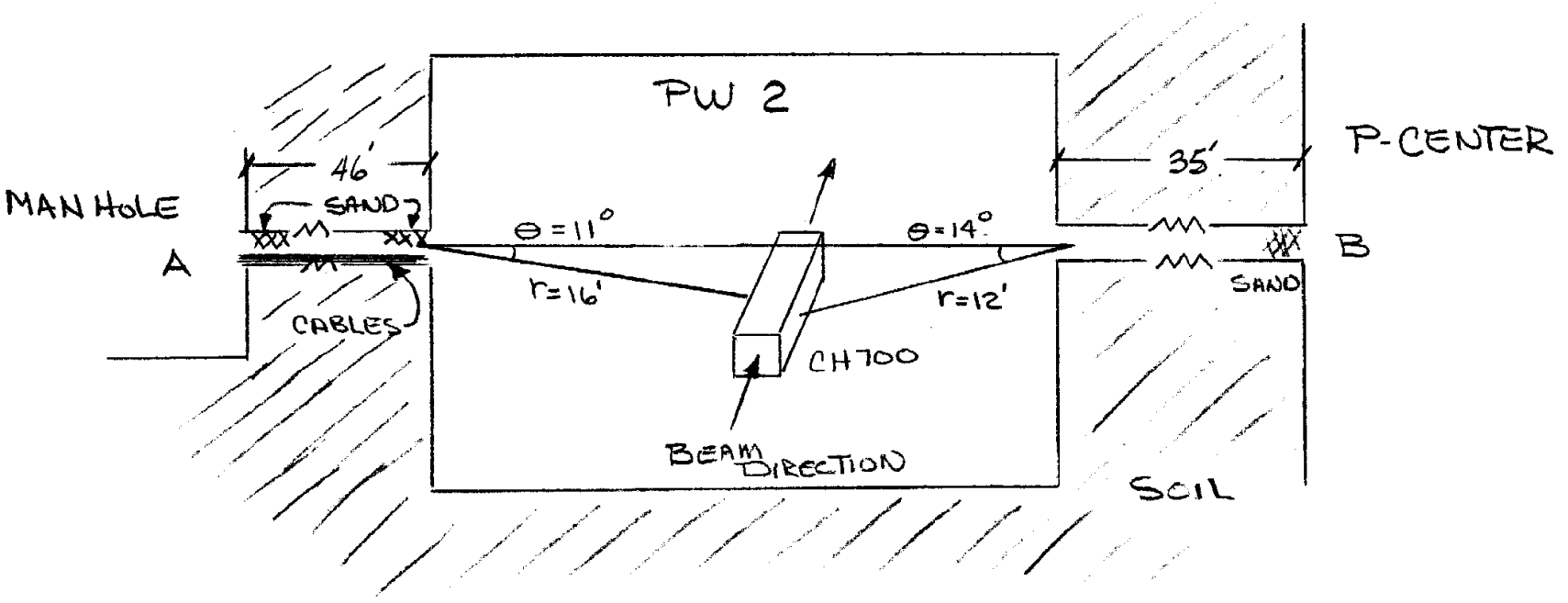
* Assuming this 12" penetration was ½ full of cables

** With sand plugging only the side closest to the neutron, the measured dose rate did not change as compared to the no-sand reading.

# FIGURE 1

## CABLE PENETRATIONS

BOTH PENETRATIONS ARE 12" IN DIAMETER




BOTH PENETRATIONS ARE CENTERED ~ 2' D.S. OF U.S. COLLIMATOR FACE

COLLIMATOR = 5.75 x 5.75 x 5'